DARPA - A Unique Opportunity

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DARPA - A Unique Opportunity

DARPA

- Offers exciting challenges
- Supports broad array of projects
- Seeds technology development and accelerates system insertion
- Distributes significant defense R&D funding

DARPA

Provides a unique opportunity to join a very exclusive "club"…

where technology A-teams demonstrate creativity and revolutionary achievements

An opportunity that can change your life!

Today's Discussion

Speakers asked to address:

- **Interactions with DARPA**
  - **Individual**
  - **Company**
- **Arrangements with universities**
- **Science of interest**

DARPA as a Customer

- **Similar to a venture capitalist - looking for the best ideas, best champions, best investments**
- **Open to creating new programs around original, paradigm changing concepts**
- **Accessible, highly qualified program managers**
- **Little tolerance for slick marketing or entitlement mentality**
- **No internal R&D infrastructure or laboratory to support**

Translates to opportunities for individuals, institutions, and technologies

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As an individual…

- **C. G. Kirkpatrick (Conilee), Vice President, HRL Laboratories**

- **Defense Contractor - since early 1970s**
  - **U of Illinois, General Electric, Rockwell, SAIC, Hughes, HRL**
  - **First DARPA contract in 1970's**
  - **Still involved in DARPA programs**

- **Defense & Government Advisor - since late 1980s**
  - **SETA (Science, Engineering and Technical Advisor) to DARPA MTO**
  - **NIST VSAT (Board of Visitors)**
  - **Reviewer, OBR (Office of Basic Research), NRL (Naval Research Lab Electronics), ARO (Army Research Office)**
  - **AGED (Advisory Group on Electron Devices (Services, DARPA, NASA, DOE)) Member**
  - **TARA reviewer (Technology Area Review Assessment) for DoD**
  - **DSRC (Defense Sciences Research Council) Member for DARPA**
  - **Member, AF Electronics, EO and Optics Industrial Advisory Council**
  - **Member, National Materials Advisory Board**

As an individual (continued)

- **High technical caliber of DARPA PMs and PIs results in working relationships characterized by mutual support and collaboration**

- **Participation in DARPA programs fosters valuable technical networks**

  - **My first DARPA contract, "Advanced Archival Memory" for $1M (a lot of money in the 1970's) - early e-beam and ion beam lithography, at GE CR&D**
  - **First DARPA GaAs Pilot Line (when GaAs was the "technology of the future and always will be") - compound semiconductors meet integrated circuits, at Rockwell**
  - **DARPA SETA (Scientific, Engineering and Technical Advisor) - compound integrated circuits and fab equipment evolution, at MTO**
  - **IEEE Fellow**
  - **First DARPA neural network chip with on-chip learning, at SAIC**
  - **First DARPA InP Pilot Line (resulting technology now being inserted on the flight line in F-18s) and more, at HRL**

Long term success as a scientist or engineer, involves more than being a "lone ranger" – it results from bringing together the right challenges, best minds and hands, and resources - DARPA programs enable this

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Examples of DARPA Programs at HRL with University Partners

Electronic Spin Injection	The University Of Iowa California Institute of Technology UCLA
Antimonide Based Compound Semiconductors (ABCS)	Duke University University of Notre Dame Du Lac Board of Regents of the U. of Wisconsin
Quantum Information Science and Technology (QuIST)	UCLA
Automated Design Tools for Integrated Mixed Signal Microsystems (NeoCAD)	Univ. Of Kentucky Research Foundation
Application of GaN HFET Technology for Advanced Mixed Signal Circuits	University Of California, San Diego
MEMS Quartz-Based Resonators	UCLA
Analog Optical Signal Processing for Wideband Radars and Electronic Support Measure Systems	California Institute of Technology
Widebandgap Semiconductor Technology Initiative-Thrust 1-RF/Microwave/Millimeterwave Technology	University Of California, San Diego
Technology for Frequency Agile Digitally Synthesized Transmitters (TFAST)	University Of California, San Diego
Operational Effectiveness Evaluation with In-House, High-Fidelity, and Real-Time Battlefield Emulation	Mississippi State University
Photonic A/D Converter Technology	California Institute of Technology University Of California, San Diego
Quantum Device Technologies for Terahertz Communications and Imaging	Regents of the University of California
Reconfigurable Aperture (RECAP)	UCLA
Steered Agile Beam (STAB)	University Of Southern California Kent State University
Agile Waveform Generation and Frequency Conversion	University Of California, San Diego
Compact Navigation, Guidance and Control Actuator for Miniature Kinetic Energy Missiles	UCLA

Finding Out About Opportunities

- **Best - customer interacts with you *in advance* to form his(her) program plans**
- **Less than optimal - you *(and everyone else!)* read a publication or attend a meeting describing program plans**
- **Late - spot a FedBizOps announcement or Web notice**
- **Worst - competitor tells you about it**

Collaboration

Collaboration can:

increase the win probability by

- adding a well-respected or well-positioned participant
- bringing in unique capabilities
- eliminating a competitor(s)
- helping meet special goals or requirements (SBIR, set-side, pork, HBU, woman or minority owned, etc.)

decrease prospects by

- adding a poor performer to bid
- increasing costs
- making the program appear too complicated to manage

Desirable University Partners

Principal Investigator

- Recognized player
- Will actually be involved (not offload on grad students)
- U.S. citizen or U.S. person
- Understands deadlines, proposal & program basics
- Can describe their work (write and talk)

Academic Institution

- Reasonable IP (Intellectual Property) policies
- Respects ITAR/EAR requirements
- Accepts Customer Publication Review Flow downs
- Supports staff with equipment, space, etc.
- Generates high caliber graduates for workforce

Preferred R&D Contract Vehicle

- **FAR/D-FAR (governed by Federal Acquisition Regulations) contract**
- **HRL prime**
- **CPFF (Cost Plus Fixed Fee)**
- **Unclassified**
- **Multi-Year**
- **Subs accept government flow downs**

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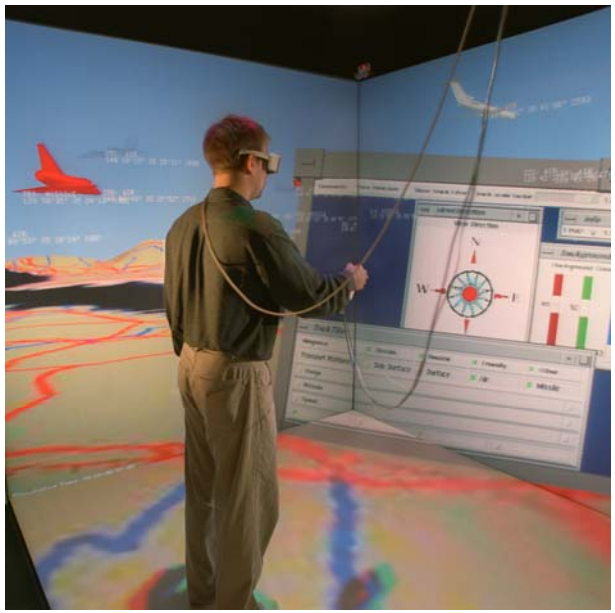
HRL Technology Focus Areas



- RF/Analog Components
- Digital & Mixed Signal ICs
- Antennas
- Advanced Materials
- Sensors
- Lasers

- Photonics
- Communications & Networking
- Algorithms & Information Sciences
- Computational Physics
- Emerging Technologies

Technology Focus Areas (cont.)

RF/Analog Components
InP DHBTs, GaN, Sb-diodes, InP HEMTs, power, harsh environments

Digital & Mixed Signal ICs
InP HBT, RF CMOS, SiGe BiCMOS, subsystem on chip, ADCs, secure chips

Antennas
Tunable, wearable, conformal, small. multiband, low cost, steerable

Advanced Materials
Biomimetic, morphable, lightweight, energy-related, integrated

Sensors
MEMS, IR, nano, chem, bio, light, mmwave, proximity

Lasers
Self organized fibers, Terahertz sources

Photonics
Integrated photonics, specialty detectors, microresonators

Communications & Networking
Mobile, ad hoc networking

Algorithms & Information Sciences
Learning, reasoning, adaptive signal processing, recognition, prognostics, diagnostics

Computational Physics
Multidisciplinary modeling & physics

Emerging Technologies
Nano, diamond, SiC, quantum, bio, neuromorphic, nonlinear, evolvable, low energy

Tell us what is next!

New Challenges

Finding DARPA-hard problems? they are all around you!

Pictures from DSRC site visits

Talk with Service men and women, Veterans, First responders

Study the Web, Newspapers Trade mags, CNN™

The really unique opportunity

Consider working as a PM at DARPA

- **Education of a lifetime**
- **Great colleagues and experiences**
- **Serve our nation**